

Case 9973(2)

Claims

1. An apparatus, comprising a vessel which is a batch reactor of from 1 ml and up to 500ml in volume, said vessel having a conduit extending therefrom, a stirrer, a section of which is adapted to be located within the conduit and a section of which is adapted to be located within the vessel, wherein said stirrer is adapted such that, when rotated in a first direction, material contained within the conduit is conveyed in a direction towards the vessel, and when rotated in a second direction, material contained within the conduit is conveyed through the conduit in a direction away from the vessel, and a stirrer drive able to rotate the stirrer in both the first direction and the second, opposite, direction.
2. The apparatus according to claim 1, wherein the stirrer comprises a first part adapted to be connected to the stirrer drive and comprising the section of the stirrer which is adapted to be located within said vessel, said first part being further adapted to stir material in the vessel when the stirrer is rotated, and a second part, adapted to be connected to said first part and comprising the section of the stirrer which is adapted to be located within the conduit.
3. The apparatus according to claim 2 wherein the first part comprises a shaft about which are located one or more stirrer blades.
4. The apparatus according to any one of the previous claims wherein the section of the stirrer which is adapted to be located within the conduit comprises one or more flutes which describe a helical path about the rotational axis of the stirrer.
5. The apparatus according to claim 6 wherein the one or more flutes have a helical angle of between 20° and 70°.

6. The apparatus according to any one of the preceding claims wherein the section of the stirrer adapted to be located within the conduit, is such that, in use within the conduit, the portion at a location within the conduit has an effective diameter of at least 50%, preferably in the range 70 to 90%, of the inner diameter of the conduit at that location within the conduit.
7. A high throughput reaction system comprising 4 or more apparatuses as claimed in any one of the preceding claims.
8. A method of stirring one or more materials in an apparatus, which method comprises using an apparatus as claimed in any one of claims 1 to 6 or a high throughput reaction system as claimed in claim 7.
9. A method of stirring one or more materials in an apparatus, which method comprises
- (i) providing an apparatus comprising a vessel having a conduit extending therefrom, which conduit is a tube of cylindrical inner diameter at the base of which is a conduit valve which allows the bottom of the conduit to be sealed, and a stirrer, a section of which is adapted to be located within the conduit and a section of which is adapted to be located within the vessel, wherein said stirrer is adapted such that, when rotated in a first direction, material contained within the conduit is conveyed in a direction towards the vessel, and when rotated in a second direction, material contained within the conduit is conveyed through the conduit in a direction away from the vessel,
 - (ii) providing one or more materials in the vessel,
 - (iii) stirring said one or more materials using the stirrer, wherein with the conduit valve closed, the stirrer is configured to turn in the first direction such that the stirrer stirs the materials in the vessel, whilst the section of the stirrer which is adapted to be located within the conduit rotates such that material that may fall into the conduit is conveyed back in to the vessel, and
 - (iv) reversing the direction of the stirrer and opening the conduit valve when it is desired to remove material from the vessel.
10. A method according to claim 9 wherein the vessel is a batch reactor of from 1 ml and up to 500ml in volume.